REMARKS

Claims 1-15 are pending in the present application. Claims 1, 2, 5, 6, 9 and 15 are amended. Clams 1 and 9 are independent.

As per the Examiner's comments regarding the Abstract, an amended Abstract has been submitted herewith.

Claim Rejections - 35 U.S.C. § 112

Claims 1-15 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. Applicants respectfully traverse this rejection.

As per the Examiner's comments, claims 1, 9, 10 and 15 have been amended.

Regarding claim 5, the Examiner stated that "the whole length" lacks antecedent basis. However, claim 5, line 6 positively recites "a whole length." Therefore, "the whole length" has sufficient antecedent basis.

Accordingly, Applicants respectfully request removal of this rejection.

Claims 1-15 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Document 1: Impact Engineering, Nikkan Kogyo Newspaper Ltd., October 28, 1988, pps. 173-183 in view of Document 2: Lecture Thesis of 16th Series of Chugoku Branch of Japan Design Engineering Society Ass'n, June 20, 1988, pps. 25-29. Applicants respectfully traverse this rejection.

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness. According to MPEP § 2143, to establish a *prima facie* case of obviousness, the prior art reference or references when combined must teach or suggest all of the claim limitations.

Document 1 discloses a striker bar type Hopkinson bar method including a striker bar, an input bar, a specimen and an output bar, and gauges on the input and output bars. As shown in Fig. 7.1, gauge G_B is positioned on the input bar and gauge G_C is position on the output bar. However, Document 1 does not provide any disclosure of the sizes of the input bar and the output bar.

Therefore, Document 1 does not teach all of the features of claim 1 which include "a length of said output bar is set to a range from 500mm to 2500mm ... and a length of said input bar is set to a range from 1500mm to 2500mm."

The Examiner relies on Document 2 to make up for the deficiencies of Document 1. Document 2 discloses an impact compression testing apparatus including an input bar, strain gauges, a striker bar, and an output bar. As discussed in paragraph 3.2, the input and the output bars are both 1000mm in length. Document 2 provides no other disclosure regarding the length of the input and output bars.

In summary, the length of the input bar "set to range from 1500mm to 2500mm," as recited by claim 1, is not disclosed by Document 1 or Document 2. Document 1 does not disclose any length input bar, and the length of the input bar disclosed by Document 2 is 1000mm, which is not within "1500 mm to 2500mm."

Therefore, Document 2 fails to teach the features of claim 1 recited above and does not make up for the deficiencies of Document 1.

Accordingly, claim 1 is allowable over the prior art.

Regarding dependent claims 2-8, these claims are allowable for at least the reasons of corresponding independent claim 1. Therefore, Applicants respectfully request removal of this rejection.

Claim 9 as amended, recites, "hitting a front end of an input bar having a length in the range of 1500mm to 2500mm, with a specimen held between a rear end of said input bar and a front end of an output bar having a length in the range of 500mm to 2500mm." As discussed above, Document 1 and Document 2, either alone or in combination, also do not teach all of the features of independent claim 9.

Accordingly, claim 9 is allowable over the prior art. Regarding dependent claims 10-15, these claims are allowable for at least the reasons of the corresponding independent claims.

CONCLUSION

In view of the foregoing, Applicants submit that claims 1-15 are patentable over the relied upon references, and that the application as a whole is in condition for allowance. Early and favorable notice to that effect is respectfully solicited.

In the event that any matters remain at issue in the application, the Examiner is invited to contact Jayne Saydah (Reg. No. P-48,796) at (703) 205-8000 in the Northern Virginia area, for the purpose of a telephonic interview.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Abstract of the Disclosure

The Abstract of the Disclosure has been amended as follows:

--ABSTRACT OF THE DISCLOSURE

A viscoelastic characteristic value-measuring apparatus, using a split Hopkinson's bar, having an impact bar, input bar, and an output bar. [(3) which is hit with an impact bar and on which a] The input bar has a first strain gauge [(7)] and a second strain gauge. [(9) are installed; and an] The output bar [(5) which is connected with the input bar (3) through a specimen and on which] has a third strain gauge [(11)] and a fourth strain gauge [(13) are installed]. The input bar [(3)] and the output bar [(5)] are made of a viscoelastic material, and a specimen is in between the input bar and the output bar. The length of said output bar is set to a range from 500mm to 2500mm both inclusive. The length of said input bar is set to a range from 1500mm to 2500mm both inclusive.--

In the Specification:

On page 3, please replace the second paragraph containing lines 5-10 with the following rewritten paragraph:

--It is to be noted that in the description made below the incident strain wave, the reflected strain wave, and the transmitted strain wave are abbreviated as a "strain wave" as necessary and that the input bar and the output bar are abbreviated as a "stress bar" as necessary.--

On page 5, please replace the third paragraph containing line 25 through page 6 containing lines 1-25, with the following rewritten paragraph:

--That is, in the case of the specimen made of the comparatively soft viscoelastic material, the progress speed of the strain wave is higher in the input bar than in the specimen. The strain wave is reflected by its rear end. When the input bar is short, a first reflected strain wave (to be measured with the strain gauge installed on the input bar) reflected from the rear end of the input bar

progresses to the front end thereof, reaches its front end at which the first reflected strain wave is reflected (second reflected strain wave). Thus, when the input bar is short, it is difficult to measure a correct strain amount of the reflected strain wave, because the second reflected strain wave is also measured with the strain gauge installed on the input bar, with the first and second reflected strain wave interfering with each other. Accordingly, it is necessary to space the strain gauge at an appropriate interval from the front end of the input bar to damp the second reflected strain wave. It is also necessary to space the strain gauge for measuring the incident strain wave and the strain gauge for measuring the first reflected strain wave at a required interval because near the rear end of the input bar, the incident strain wave and the first reflected strain wave interfere with each other. For [the] this reason, the input bar is required to be long.--

In the Claims

The claims have been amended as follows:

1. (Amended) A viscoelastic characteristic value-measuring apparatus [having] comprising:

an input bar and an output bar arranged in a straight line to hold a specimen made of a viscoelastic material therebetween;

first and second strain [gauge] gauges installed on said input bar to measure an incident strain wave generated when a front end of said input bar is hit and a reflected strain wave; and

third and fourth strain gauges installed on said output bar to measure a transmitted strain wave transmitted from said input bar to said output bar through said specimen,

wherein said input bar and said output bar are made of [an] a viscoelastic material;

a length of said output bar is set to a range of 500 mm to 2500mm both inclusive; and

a length of said input bar is set to a range from 1500mm to 2500mm both inclusive.

2. (Amended) The measuring apparatus according to claim 1, wherein the length of said output bar is relatively less than [that] the length of said output bar.

5. (Amended) The measuring apparatus according to claim 1, wherein said first strain gauge is installed on said input bar at a front side thereof, and said second strain gauge is installed thereon at a rear side thereof, such that said first strain gauge is located between a position spaced at an interval of 10% of a whole length of said input bar from a rear end thereof and a position spaced at an interval of 70% of the whole length thereof from the rear end thereof and [that] said second strain gauge is located between a position spaced at an interval of 8% of the whole length of said input bar from the rear end thereof and a position spaced at an interval of 62% of the whole length thereof from the rear end thereof.

6. (Amended) The measuring apparatus according to claim 1, wherein said third strain gauge is installed on said output bar at a front side thereof, and said fourth strain gauge is installed thereon at a rear side thereof, such that said third strain gauge is located between a position spaced at an interval of 4% of the whole length of said output bar from a front end thereof and a position spaced at an interval of 25% of the whole length thereof from the front end thereof and [that] said fourth strain gauge is located between a position spaced at an interval of 8% of the whole length of said output bar from the front end thereof and a position spaced at an interval of 50% of the whole length thereof from the front end thereof.

9. (Amended) A method of measuring a viscoelastic characteristic value [by using a viscoelastic characteristic value-measuring apparatus according to claim 1], comprising the steps of:

hitting a front end of an input bar having a length in the range of 1500mm to 2500mm, with a specimen held between a rear end of said input bar and a front end of an output bar having a length in the range of 500mm to 2500mm to generate a strain wave including an incident strain wave, a reflected strain wave, and a transmitted strain wave propagating in said input bar, said specimen, and said output bar;

measuring said incident strain wave and said reflected strain wave with first and second strain gauges installed on said input bar, and measuring a transmitted strain wave with third and fourth strain gauges installed on said output bar;

estimating a history of said incident strain wave at the rear end of said input bar, a history of said reflected strain wave at the rear end of said input bar, and a history of said transmitted strain wave at the front end of said output bar by using a history of said each strain wave;

computing a strain speed history of a specimen, a strain history thereof, and a stress history thereof from said estimated history of said incident strain wave, said history of said reflected strain wave, and said history of said transmitted strain wave and determining a stress-strain curve of said specimen; and

computing a viscoelastic characteristic value [such as] including Young's modulus[,] or a loss factor, [and the like] from said stress-strain curve.

15. (Amended) The method according to claim 9, wherein a front end of said input bar is hit with [said] an impact bar at an impact speed of 1m/s - 70m/s.